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Quality Assurance Program Planning Committee

CTF-066987

AGENDA

W31

QAPPC MEETING

February 15, 1984

RECEIVED

AUG 14 '91

CENTRAL TECH FILE

It is intended that the following items be discussed at the subject meeting. It is not intended, however, that discussions be limited to this listing. Other items will be taken up as presented by QAPPC members.

1. Introductions

2. QAPPC functions

3. NMSEP

New Material & Stockpile Evaluation Plan

4. Laboratory Test Program

QEST

5. Retrofit

a. Background

b. Description

c. Procedures for accomplishment

✓ 6. BB Drawing review and completion

7. QEST/centrifuge changes, including time scales

8. REST units

a. Quantities/dates

b. Special inspections and test procedures

9. Summary

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replace HVTB \rightarrow step-up DC-DC converter
 Strong link switches
 Enclosure (steel banners) for fire protection
 Unique signal generator USG
 Lining ¹¹ connector LAC Same bracket
 Cat B Pal ^{MC3761} PAL
 Guard Plug
 W31 Nike Hercules

MC3775

*Modernized version
Nuclear safety
Retrofit*

1. GENERAL

- 1.1 Introduction. This document has been compiled to define the requirements for the W31 Mod 3 Stockpile Laboratory Test Program (LTP). These test requirements were formulated to (1) determine whether the system will function in accordance with design intent, and (2) to provide data for the assessment of the quality and reliability of the W31 Mod 3 stockpile.

Also included, as a secondary function, are requirements to obtain data for assessing individual component integrity and possible deterioration with age and to permit analysis of any test anomalies that might occur.

- 1.2 Warhead Description. The W31 Mod 3 contains an MC3777 Fire Set, and an MC3761 Unique Signal Generator (USG). The Mod 3 is used only on a selected number of the Army's Nike Hercules missile systems. The Army components provide all the arming and firing signals to the warhead.

- 1.3 Safety Considerations. All persons involved with the handling, disassembly, and test of weapons as required by this instruction should be fully aware of the different explosive or otherwise hazardous components contained within the W31 Mod 3 weapons. All approved safety practices should be observed with regard to high voltage and high explosives which will be encountered in testing the W31.

Only electrical test equipment authorized for this weapon program and also listed in the AL Master Tester List shall be connected to units containing an HE/nuclear assembly. All other electrical equipment in the critical assembly area that is capable of detonating explosives or operating weapon components should be removed if feasible.

For all nuclear explosive operations specified in this document, both the DOE and DOE/AL General Nuclear Safety Rules and the AL Specific Nuclear Safety Rules Published in DOE Order 5610.3, Chapter V and AL Order 5610.3, Chapters V and XII, respectively, shall apply and govern. See NS----- and P----- for all rules.

For all nuclear explosive operations specified in this document, the Emergency Procedures published in AL Order 5610.3, Chapter XIII shall apply.

Specific Requirements. The design and layout of the test equipment and the procedures for operating it shall afford the operator maximum protection from the hazards of high voltage.

1.4 Definition of Terms.

- 1.4.1 Disassembly and Inspection (D&I) is defined to include all tests and inspections performed on the warhead prior to and during warhead disassembly in preparation for the system test.
- 1.4.2 System tests are defined as those tests performed using the Quality Evaluation System Tester (QEST) and the Multiple Use Centrifuge System.
- 1.4.3 Post-system tests are defined as all tests performed after the system tests.
- 1.4.4 System function criteria are those criteria which, if met, will result in successful system function.
- 1.4.5 Additional requirements are requirements which have been incorporated to accomplish the following:
 - 1.4.5.1 Allow assessment of components (and indirectly system) degradation as a function of stockpile age.
 - 1.4.5.2 Allow redundant channel performance checks.
 - 1.4.5.3 Indicate satisfactory system performance in areas not specified as system function criteria.
 - 1.4.5.4 Provide variables information on component performance.

1.5 Test Conditions.

- 1.5.1 D&I tests specified in Drawing BC----- shall not commence until the unit has been temperature stabilized to room temperature. Disassembly and all subsequent testing will be performed at room ambient conditions, except as provided in BC-----s. (This does not apply to receiving or storage inspections.)
- 1.5.2 Responsible personnel conducting the various phases of the test sequence shall immediately notify the SNL system evaluation engineer (SEE), Division 7262, upon occurrence of any significant abnormal results of a test or inspection. No further disassembly connections or disconnection from the unit or tester may be made, following an abnormal result until the SEE give specific approval.

NOTE: This does not apply to an emergency or safety situation; safety procedures always take precedence.

The decision as to whether an observed defect is significant rests with the SEE in concert with the design group involved.

1.6 Disassembly and Inspection (D&I).

1.6.1 General. By definition, D&I will include all test and inspections performed on a warhead prior to and during warhead disassembly.

1.6.2 Disassembled Configuration.

The system as received by the QEST group will consist of the support structure and fire set.

Cables that are disconnected are:

- a.
- b.
- c.
- d.
- e.

1.7 Warhead System Tests. All units are first subjected to an acceleration environment, ~~with voltage applied to the USG,~~ and then are tested using the W31 Quality Evaluation System Tester (QEST) modified for testing the Mod 3 version.

1.7.1 Test Sequence.

1.7.1.1 Centrifuge Test. The warhead support structure is to be subjected to a missile acceleration profile to cause function of the ESDs. Voltage will be applied to the Unique Signal Generator to unlatch the ESDs.

QEST The warhead electrical system is to be subjected to a test which shall supply all functions necessary for arming and firing, in such combinations to give the system the most severe test possible within specification limits. The system is to be fired single channel, with the second channel fired per paragraph 1.x.x. The channel used will be alternated test to test.

1.7.2 Test Configuration. The test configuration and simulated components of the warhead electrical system used for the various versions of the warhead are as follows: All versions employ xx sugar loaded detonators as a fire set load.

1.7.2.1 Components included in the electrical system test will be:

- one MC3777 Fire Set
- one MC3761 Unique Signal Generator
- one CF2710
- one CF2370

No simulation of components is needed except for the simulated detonator complement.

1.7.3 Monitored Functions and Data Collected.

1.7.3.1 Centrifuge test, recorded data.

- | | |
|---------------------------|------------------|
| 1. USG power | Voltage/time |
| 2. MC2935 switch open | Event in time |
| 3. MC2138 Switches closed | Event in time |
| 4. Acceleration in (g) | Amplitude in g's |

1.7.3.2 System Test, recorded data.

<u>Function</u>	<u>Monitor Point</u>	<u>Parameter</u>
1. A1	P2E, F	Input voltage
2. A2	P2J, K	Input voltage
3. Fire A	P2R to P2L	Voltage & time
4. Fire B	P2S to P2M	Voltage & time
5. Converter output	P2X	Output voltage
6. USG power	P2C	Input voltage
7. USG signal	P2D	Input voltage
8. MC2935 Mon.	P2U or A	Sw closure
9. MC2138 Mon.	P2V or B	Sw closure
10. Converter	P2T	A2 at OSC
11. Converter	P2Y	A1 at PWR

1.8 Post System Test.

1.8.1 Redundant Fire Circuit check

1.8.2 Capacitance Measurement

2. Documents Required (to be added)

3. REQUIREMENTS.

3.1 Centrifuge Test Configuration. The test configuration will be the complete MC3777 Fire Set.

3.1.1 Applied Environment. The centrifuge shall apply a missile profile acceleration and USG power as required in Uxxx Computer Controlled Centrifuge System.

3.2 System Test. The tester will be required to supply the following external actions or conditions to simulate inputs received by the weapon under test during actual usage. In addition, the tester will be so designed as to require minimal reliance on operator personnel to assure a good test and no loss of data through operator error. Further, the QUEST will be required to assess the results of the test and to compare these results with the Sytem Function

Criteria and yield an immediate indication of the success or failure of the system under test to meet or exceed these criteria.

3.2.1 Tester Applied Signals.

3.2.1.1 Signals A1, B1. (To be added.)

3.2.1.2 Signals A2, B2. (To be added.)

3.2.1.3 Unique Signal Generator Power. (To be added.)

3.2.1.4 Fire Signals. (To be added.)

3.3 QEST Timing Requirements. All time based functions for both signal application and recorded data shall have real time base accuracy of one percent or better. Tester applied signals, and duration of test are referenced to the application of signals xx,yy, the . These times are measured in tenths of seconds ± 1 percent. Other time requirements in the system function criteria are referenced to the rising voltage at load coil during fire set discharge, these times are measured in tenths of microseconds ± 1 percent.

3.4 Test System Ground Circuit Requirements.

3.4.1 Power sources used to supply signals to the MC3777 must be referenced to warhead ground presented to the tester at Jxx and Jxx. These grounds shall be kept separate and isolated from other tester ground return, ands from AC power grounds.

3.4.2

3.4.3

3.4.3

4. QUALITY PROVISIONS.

4.1.1 Centrifuge Test. The inertial switch contacts must close and latch within the G profile described in 3.1.1.

4.1.2 System Test.

Exemption 7

4.1.2.1

4.1.2.2

Exemption 7

4.1.2.3 Fire Set Load. All xx sugar loaded detonators shall have opened.

4.2 Additional Requirements.

4.2.1 (Fire Set output requirements to be added.)

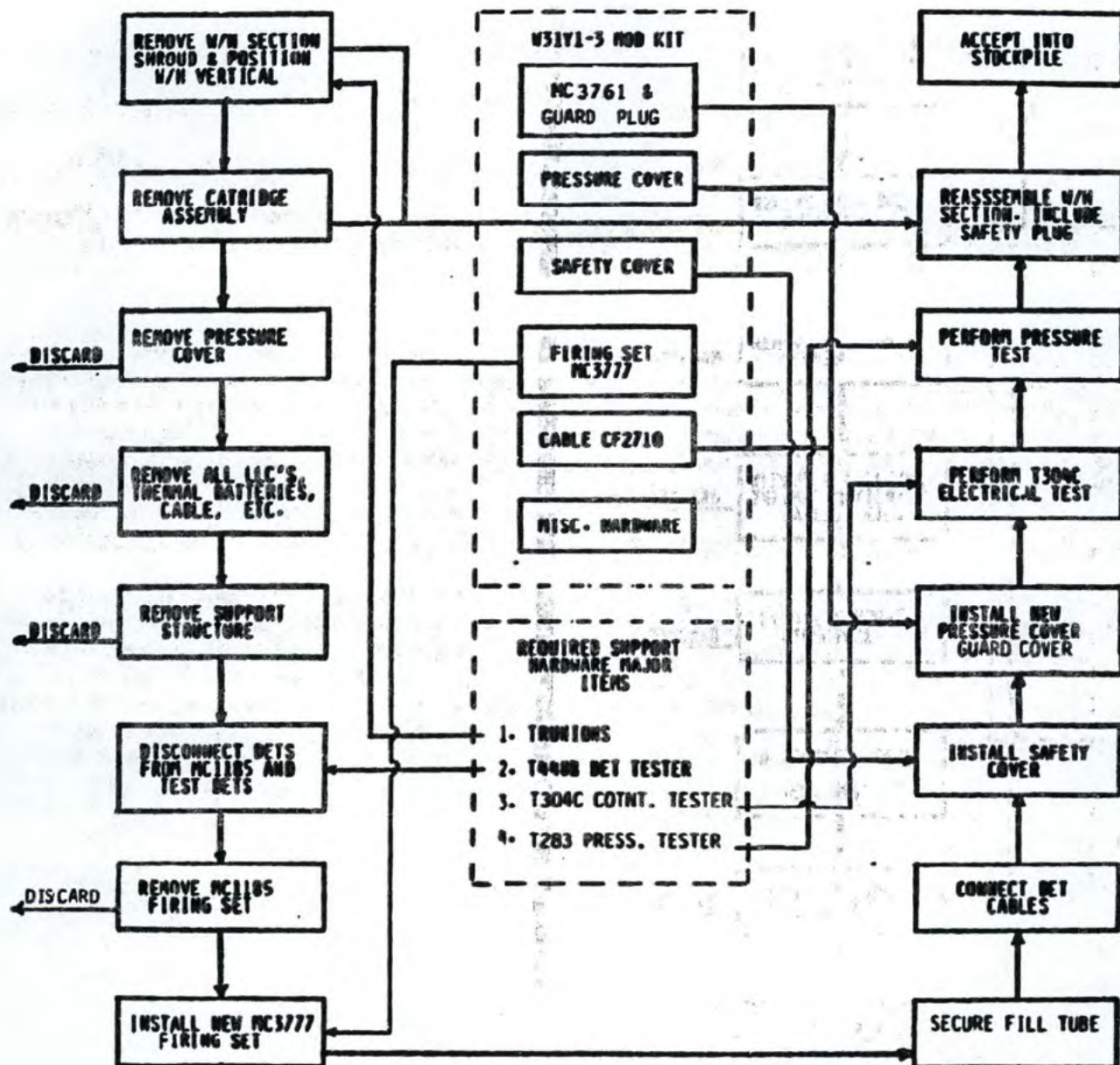
4.2.2 Pretest of detonator cables and sugar loaded detonators will be accomplished.

4.2.3 Contact closure of the ESD will be recorded.

5. COMPONENTS DESTRUCTIVELY TESTED.

The following components are destructively tested during each system test:

(To be added.)



Flow Diagram
W31